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PROSKAUER ROSE LLP
One International Place
Boston, MA 02110

EXAMINER	
HA, JULIE	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,407	FAIRLIE ET AL.	
	Examiner	Art Unit	
	JULIE HA	1654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *09 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *102-156 and 158-160* is/are pending in the application.

4a) Of the above claim(s) *117-150,152-156 and 158-160* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *102-115 and 151* is/are rejected.

7)☒ Claim(s) *116* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/9/09; 11/9/09*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *Sequence Non-compliance Notice*.

DETAILED ACTION

Response to Election/Restriction filed on November 09, 2009 is acknowledged. Claims 1-101, 157 have been cancelled. Claims 102-156 and 158-160 are pending in this application.

Restriction

1. Applicant's election with traverse of Group I (claims 102-116 and 151) and the election of SEQ ID NO: 46 as the species in the reply filed on November 09, 2009 is acknowledged. The traversal is on the ground(s) that the Examiner has not established a substantive basis for holding lack of unity where neither an X level reference, or a Y level reference, showing the inventions are not joined by a special technical feature has been set forth. Applicant further argues that there is no undue burden in examining the method claims with the product claims. This is not found persuasive because as described in the previous office action, the compounds are patentably independent and distinct because of the amino acid contents are different, and thus structure are different. The peptide sequences are different and therefore, each sequence is structurally distinct. There is no common structure present. For example, a cyclic pentapeptide having the sequence KSSSD is structurally different from a cyclic pentapeptide having the sequence KARAD.

Again, the situation involving the so-called Markush practice wherein a single claim defines alternatives (chemical or non-chemical) is also governed by PCT Rule 13.2. In this special situation, the requirement of a technical interrelationship and the same or corresponding special technical features as defined in PCT Rule 13.2, shall be considered to be met when the alternatives are of a similar nature.

When the Markush grouping is for alternatives of chemical compounds, they shall be regarded as being of a similar nature where the following criteria are fulfilled:

(A) All alternatives have a common property or activity; and

(B)

(1) A common structure is present, i.e., a significant structural element is shared by all of the alternatives; or

(B)

(2) In cases where the common structure cannot be the unifying criteria, all alternatives belong to a recognized class of chemical compounds in the art to which the invention pertains.

In paragraph (B)(1), above, the words “significant structural element is shared by all of the alternatives” refer to cases where the compounds share a common chemical structure which occupies a large portion of their structures, or in case the compounds have in common only a small portion of their structures, the commonly shared structure

constitutes a structurally distinctive portion in view of existing prior art, and the common structure is essential to the common property or activity. The structural element may be a single component or a combination of individual components linked together.

In paragraph (B)(2), above, the words “recognized class of chemical compounds” mean that there is an expectation from the knowledge in the art that members of the class will behave in the same way in the context of the claimed invention. In other words, each member could be substituted one for the other, with the expectation that the same intended result would be achieved.

Furthermore, burden doesn't play a role in 371 Applications. Therefore, this argument is moot.

The requirement is still deemed proper and is therefore made FINAL. Claims 117-150, 152-156 and 158-160 are hereby withdrawn from further consideration, as being drawn to nonelected inventions. Claims 102-116 and 151 are examined on the merits in this office action.

Sequence Non-compliance

2. Applicant is advised that the application is not in compliance with 37 CFR §§ 1.821-1.825. Applicant is required as part of a response to this action to comply with 37 CFR §§ 1.821-1.825, and that failure to do so will result in abandonment of the application. Applicant should refer to the attached "Notice to Comply" for instructions.

Objection

3. The abstract is objected to for the following minor informality:

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The

abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

In the instant case, the abstract recites, “The invention discloses...” at line 1 of the abstract. Further, at line 5, the abstract recites, "More particularly the invention discloses…" Applicant should correct these informalities. See MPEP 608.01(b). For example, line 1 should read, “Short chain peptides that have been constrained…are disclosed.”

4. The specification is objected to for the following reasons: Figure 12 discloses peptide sequences FGGFTGARKSARK and TGARKSARK that are missing sequence identifiers. The Figure 12 description does not indicate what sequence identifiers these are. The proper way to claim a peptide sequence is for example, FGGFTGARKSARK (SEQ ID NO: 80) (see 37 CFR 1.821(d)). This error should be corrected.

5. The specification is objected to for the following: The specification indicates "incorporation by reference" of certain documents. The MPEP states the following: "An application as filed must be complete in itself in order to comply with 35 U.S.C. 112. Material nevertheless may be incorporated by reference. An application for a patent when filed may incorporate “essential material” by reference to (1) a U.S. patent, >or< (2) a U.S. patent application publication, **>which patent or patent application publication does not itself incorporate such essential material by reference…”Essential material” is defined in >37CFR1.57(c)< as that which is necessary to (1) **>provide a

written description of the claimed invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and set forth the best mode contemplated by the inventor of carrying out the invention as required by the first paragraph of 35 U.S.C. 112, (2) describe the claimed invention in terms that particularly point out and distinctly claim the invention as required by the second paragraph of 35 U.S.C. 112…" (see MPEP 608.01(p)).

6. The specification is objected to for the following reason: Example 8 discloses, "Synthesis of SEQ ID NOs: 77 to 80 was carried on Tentagel-S-RAM resin…" (see paragraph [0223]). There are SEQ ID NOs: 1-79 in the sequence listing filed on March 20, 2009. The SEQ ID NO: 80 is not disclosed. Applicant is required to correct this error.

7. Claim 104 is objected to for the following reason. Claim 104 does not end with a period.

8. Claim 107 is objected to for the following reason. Claim 107 has an extra period at the end of the claim.

Rejection

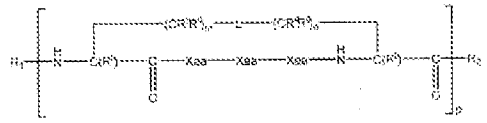
35 U.S.C. 112, second paragraph

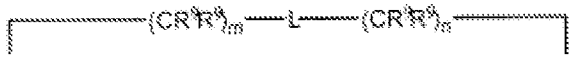
9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 102-115 and 151 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Claim 102 recites, “A compound having a plurality of alpha helical cyclic pentapeptide sequences, which is represented by formula (IV)



…” It is unclear if “  ” and” ” of “  ” represent CH_2 bonds or cyclization of the formula (IV). Because claims 103-115 depend from indefinite claim 102 and do not clarify the point of confusion, they must also be rejected under 35 U.S.C. 112, second paragraph.

12. Claim 102 recites, “…R_1 is selected from H, an N-terminal capping group, a peptide of 1 to 5 amino acid residues optionally capped by an N-terminal capping group, a non-peptidic group or a group that mimics an amino acid side chain; R_2 is selected from H, a C-terminal capping group…a group that mimics an amino acid side chain or a group that activates the terminal carboxylic acid carbonyl group to nucleophilic substitution…” It is unclear what modifications or compounds are encompassed within "a group that mimics an amino acid side chain". Furthermore, it is unclear what is considered "a peptide of 1 to 5 amino acid residues..." The dictionary defines a “residue” as “something that remains after a part is removed, disposed of, or used; remainder; rest; remnant”; “an atom or group of atoms considered as a group or part of a molecule" (see http://dictionary.reference.com/browse/residue, enclosed). It is unclear what the metes and bounds of the claim is. Because claims 103-115 depend from

indefinite claim 102 and do not clarify the point of confusion, they must also be rejected under 35 U.S.C. 112, second paragraph.

35 U.S.C. 112, first paragraph

13. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claims 102-115 and 151 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The MPEP states that the purpose of the written description requirement is to ensure that the inventor had possession, as of the filing date of the application, of the specific subject matter later claimed by him. The courts have stated:

"To fulfill the written description requirement, a patent specification must describe an invention and do so in sufficient detail that one skilled in the art can clearly conclude that "the inventor invented the claimed invention." Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (1997); *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989) (" [T]he description must clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed."). Thus, an applicant complies with the written description requirement "by describing the invention, with all its claimed limitations, not that which makes it obvious," and by using "such descriptive means as words, structures, figures, diagrams, formulas, etc., that set forth the claimed invention." Lockwood, 107 F.3d at 1572, 41 USPQ2d at 1966." Regents of the University of California v. Eli Lilly & Co., 43 USPQ2d 1398.

The MPEP lists factors that can be used to determine if sufficient evidence of possession has been furnished in the disclosure of the Application. These include "level of skill and knowledge in the art, partial structure, physical and/or chemical properties, functional characteristics alone or coupled with a known or disclosed correlation

between structure and function, and the method of making the claimed invention. Disclosure of any combination of such identifying characteristics that distinguish the claimed invention from other materials and would lead one of skill in the art to the conclusion that the applicant was in possession of the claimed species is sufficient." MPEP 2163.

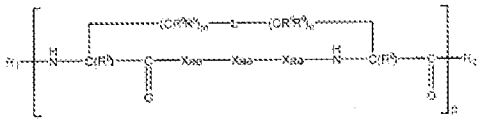
Further, for a broad generic claim, the specification must provide adequate written description to identify the genus of the claim. In Regents of the University of California v. Eli Lilly & Co., the court stated:

"A written description of an invention involving a chemical genus, like a description of a chemical species, 'requires a precise definition, such as by structure, formula, [or] chemical name,' of the claimed subject matter sufficient to distinguish it from other materials. Fiers, 984 F.2d at 1171, 25 USPQ2d at 1606; *In re Smythe*, 480 F.2d 1376, 1383, 178 USPQ 279, 284-85 (CCPA 1973) ("In other cases, particularly but not necessarily, chemical cases, where there is unpredictability in performance of certain species or subcombinations other than those specifically enumerated, one skilled in the art may be found not to have been placed in possession of a genus. . . ."). Regents of the University of California v. Eli Lilly & Co., 43 USPQ2d 1398.

The MPEP further states that if a biomolecule is described only by a functional characteristic, without any disclosed correlation between function and structure of the sequence, it is "not sufficient characteristic for written description purposes, even when accompanied by a method of obtaining the claimed sequence." MPEP 2163. The MPEP does state that for generic claim the genus can be adequately described if the disclosure presents a sufficient number of representative species that encompass the genus. MPEP 2163. If the genus has a substantial variance, the disclosure must describe a sufficient variety of species to reflect the variation within that genus. See MPEP 2163. Although the MPEP does not define what constitute a sufficient number of representative, the Courts have indicated what do not constitute a representative number species to adequately describe a broad generic. In Gostelli, the Court

determined that the disclosure of two chemical compounds within a subgenus did not describe that subgenus. *In re Gostelli*, 872 F.2d at 1012, 10 USPQ2d at 1618.

In the instant case, the claims are drawn to a compound having a plurality of alpha helical cyclic pentapeptide sequences represented by formula

(IV)  wherein R_1 is selected from H, an N-terminal capping group, a peptide of 1 to 5 amino acid residues optionally capped by an N-terminal capping group, a non-peptidic group or a group that mimics an amino acid side chain; R_2 is selected from H, a C-terminal capping group…a group that mimics an amino acid side chain or a group that activates the terminal carboxylic acid carbonyl group to nucleophilic substitution. The generic statements R_1 is selected from H, an N-terminal capping group, a peptide of 1 to 5 amino acid residues optionally capped by an N-terminal capping group, a non-peptidic group or a group that mimics an amino acid side chain; R_2 is selected from H, a C-terminal capping group…a group that mimics an amino acid side chain or a group that activates the terminal carboxylic acid carbonyl group to nucleophilic substitution do not provide ample written description for the compounds since the claims do not describe a single structural feature. The specification does not clearly define or provide examples of what qualify as compounds of the claimed invention.

As stated earlier, the MPEP states that written description for a genus can be achieved by a representative number of species within a broad generic. It is

unquestionable claim 102 is broad generics with respect all possible compounds encompassed by the claims. The possible structural variations are limitless to any class of compounds, small molecules, synthetic molecules, peptide or a peptide-like molecule that can form peptide or amide bond, or amino acid mimetics that functions as amino acids, and make up the class of capping group, amino acid residues, non-peptidic group or a group that mimics an amino acid side chain, or a group that activates the terminal carboxylic acid carbonyl group to nucleophilic substitution. It must not be forgotten that the MPEP states that if a peptide is described only by a functional characteristic, without any disclosed correlation between function and structure of the sequence, it is "not sufficient characteristic for written description purposes, even when accompanied by a method of obtaining the claimed sequence." MPEP 2163. Here, though the claims may recite some functional characteristics, the claims lack written description because there is no disclosure of a correlation between function and structure of the compounds beyond compounds disclosed in the examples in the specification.

Factors to be considered in making the determination as to whether one skilled in the art would recognize that the applicant was in possession of the claimed invention as a whole at the time of filing include: (a) Actual reduction to practice; (b) Disclosure of drawings or structural chemical formulas; (c) Sufficient relevant identifying characteristics such as: (i) Complete structure, (ii) Partial structure, (iii) Physical and/or chemical properties or (iv) Functional characteristics when coupled with a known or disclosed correlation between function and structure; (d) Method of making the claimed invention; (e) Level of skill and knowledge in the art and (f) Predictability in the art.

While all of these factors are considered, a sufficient number for a *prima facie* case are discussed below.

The specification discloses that "suitable N-terminal capping groups include acyl and N-succinate. Suitable groups that mimic an amino acid side chain are any natural or unnatural amino acid side chain that is attached to the N-terminal amino group of the peptide through a carbonyl group derived from a carboxylic acid by formation of an amide bond. Suitable mimics of amino acid side chains include, but are not limited to $CH_3CH_2C(O)(CH_2)_uC(O)$-…" (see paragraphs [0066]-[0067]). The specification discloses that "suitable C-terminal capping group is NH2. Suitable mimics of amino acid side chains are any common or unnatural amino acid side chain that is attached to the C-terminal carbonyl group of the peptide through an amine group by formation of an amide bond. Suitable mimics of amino acid side chains include but are not limited to: -$NH(CH_2)NHCH_2CH_3$…" (see paragraphs [0068]-[0069]). The specification discloses that "suitable non-peptidic groups include but are not limited to hydrophobic groups such as t-butyl, groups which stabilize or mimic alpha-helices, groups which mimic the secondary structure of peptides, particularly alpha helical peptides, such as those disclosed in WO 03/018587, groups which improve bioavailability, such as hydrophilic groups which aid aqueous solubility, for example, cyclodextrans…" (see paragraph [0071]).

The specification discloses that "the disclosure of every patent, patent application, and publication cited herein is hereby incorporated herein by reference in its entirety" (see paragraph [0291]). The MPEP states the following: "An application as filed

must be complete in itself in order to comply with 35 U.S.C. 112. Material nevertheless may be incorporated by reference. An application for a patent when filed may incorporate "essential material" by reference to (1) a U.S. patent, >or< (2) a U.S. patent application publication, **>which patent or patent application publication does not itself incorporate such essential material by reference…"Essential material" is defined in >37CFR1.57(c)< as that which is necessary to (1) **>provide a written description of the claimed invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and set forth the best mode contemplated by the inventor of carrying out the invention as required by the first paragraph of 35 U.S.C. 112, (2) describe the claimed invention in terms that particularly point out and distinctly claim the invention as required by the second paragraph of 35 U.S.C. 112…" (see MPEP 608.01(p)). For example, the suitable non-peptidic groups such as those disclosed in WO 03/018587 are essential material.

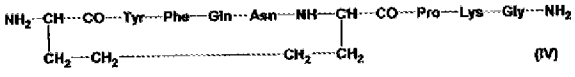
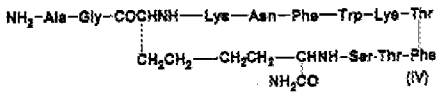
The functional features embraced by N-terminal capping group, C-terminal capping group, non-peptidic group or a group that mimics an amino acid side chain, amino acid residues, a group that mimics an amino acid side chain or a group that activates the terminal carboxylic acid carbonyl group to nucleophlilic substitution embraces not only compounds which are structurally close to each other, but also any compounds that are already known to function as these compounds, but for which that mode of action has not been identified and any compounds yet to be discovered.

The working examples describe synthesis of peptides (see Examples 1-8). Example 9 describes CD and NRM spectra studies on the cyclic penta and hexapeptides. Example 2 discloses that non-peptidic capping group is phenyl butanoic acid. The specification does not describe any other N-terminal capping group, a peptide of 1 to 5 amino acid residues optionally capped by an N-terminal capping group, a non-peptidic group or a group that mimics an amino acid side chain; R_2 is selected from H, a C-terminal capping group…a group that mimics an amino acid side chain or a group that activates the terminal carboxylic acid carbonyl group to nucleophilic substitution. The specification does not define (b) Disclosure of drawings or structural chemical formulas; (c) Sufficient relevant identifying characteristics such as: (i) Complete structure, (ii) Partial structure, (iii) Physical and/or chemical properties or (iv) Functional characteristics when coupled with a known or disclosed correlation between function and structure. No partial structure is defined that would share the functional descriptions of N-terminal capping group, a peptide of 1 to 5 amino acid residues optionally capped by an N-terminal capping group, a non-peptidic group or a group that mimics an amino acid side chain; R_2 is selected from H, a C-terminal capping group…a group that mimics an amino acid side chain or a group that activates the terminal carboxylic acid carbonyl group to nucleophilic substitution. No physical and/or chemical properties or functional characteristic when coupled with a known or disclosed correlation between function and structure is described in the specification. Description of compounds described in the specification is not sufficient to encompass numerous other compounds, peptides, proteins, organic molecules, small molecules other synthetic molecules that belong to

the same genus For example, there are varying lengths, varying amino acid compositions (for peptides), different substitutions for mimics, and numerous distinct qualities that make up the genus.

The description requirement of the patent statute requires a description of an invention, not an indication of a result that one might achieve if one made that invention. See *In re Wilder*, 736 F.2d 1516, 1521, 222 USPQ 369, 372-73 (Fed. Cir. 1984) (affirming rejection because the specification does "little more than outlin[e] goals appellants hope the claimed invention achieves and the problems the invention will hopefully ameliorate"). Accordingly, it is deemed that the specification fails to provide adequate written description for the genus of the claims and does not reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the entire scope of the claimed invention.

Conclusion

15. The art of interest is Joran (US Patent No. 5,364,851, filed with IDS). US Patent No. '851 teaches a cyclic peptide  (IV) (see Figure 2) and  (V) (see Figure 3). These do not teach pentapeptides or repeats of pentapeptides, and does not teach the variable "L" of instant claims.

Claim 116 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JULIE HA whose telephone number is (571)272-5982. The examiner can normally be reached on Mon-Thurs, 5:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cecilia Tsang can be reached on 571-272-0562. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Julie Ha/
Examiner, Art Unit 1654